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SOME MUSCINAE OF NORTH AMERICA.

GARRY DE N. HOUGH, M.D.

GIRSCHNER divides the *Muscidea* into two series—*Calyptratae* and *Acalyptratae*. The former he divides into two families, one of which is the *Anthomyidae*. Hypopleural bristles lacking. If three sternopleural bristles are present, they always have the arrangement 1 : 2 (*i.e.*, one in front and two behind). Ventral membrane usually present. Elbow of fourth longitudinal vein (if there is any) without an appendix.

This family Girschner divides into three groups :

1. *Coenosiinae*.—Fifth ventral segment of the male heart-shaped or split in the median line from the caudal border to a point beyond the middle. Fourth longitudinal vein straight. Abdomen usually elongate. Sternopleural bristles present. Squamulae separated from one another by an interspace that is broad to the very bottom; squamula thoracalis never broadened towards the scutellum.

2. *Muscinae*.—Fifth ventral segment of the male with its caudal border straight or moderately concave (lunulate), at any rate not split beyond the middle, except in *Lispe*, where it is three-pronged. Fourth longitudinal vein straight or more or less bent up toward the third in the form of an apical cross-vein. Abdomen usually short or long oval. Sternopleural bristles present. Squamulae not separated from one another, in contact at their attached borders; angle between them narrow and acute.

3. *Gastrophilinae*.—Sternopleural bristles absent. Fourth vein straight. Costal vein reaching only to or a little beyond the third vein. Squamulae but little developed, separated from one another by a projecting angle.

The *Muscinae* are divided into three sections :

a. *Muscinae coenosiaeformes*.—Front broad in both sexes.

Squamula thoracalis not broadened mesad and caudad. Wings not rilled.¹

b. *Muscinae ariciaeformes*. — Front narrow in the male, broad in the female. Squamula thoracalis not broadened mesad and caudad. Wings in the most recent forms (geologically speaking, the "youngest") rilled.

c. *Muscinae muscaeformes*. — Front as in b. Squamula thoracalis broadened out mesad and caudad as far as the edge of the scutellum. Wings rilled. Apical cross-vein present.

Girschner's family *Anthomyidae* includes, in the first two groups, the *Anthomyidae* and part of the *Muscidae* (sens. strict.) of other authors. The genera belonging to the former have been made the subject of a recent paper by Mr. Paul Stein in the *Berl. Ent. Zeit.*, Vol. XLII, pp. 151–288, 1897. This paper covers the *Coenosiinae*;² the *Muscinae coenosiiformes*; and the *Muscinae ariciaeformes*, except the genera *Myospila*, *Muscina*, *Clinopera*, *Hemichlora*, *Stomoxys*, and *Haematobia*. In these genera the fourth longitudinal vein is bent up, near its apical end, towards the third, and the arista is either pectinate or long plumose. They may be separated from one another as follows:

1. Proboscis long, slender, horny, adapted for piercing 2
 Proboscis not so constructed, provided at the tip with fleshy labellae 3
2. Palpi much shorter than the proboscis, arista pectinate *Stomoxys* Geoffroy
 Palpi nearly as long as the proboscis, arista pectinate, sometimes also
 with a few hairs below *Haematobia* Desvoidy
3. Arista pectinate *Hemichlora* v. d. Wulp
 Arista plumose 4
4. Sternopleural macrochaetae 2 : 2; eyes hairy *Myospila* Rondan
 Sternopleural macrochaetae 1 : 2; eyes not hairy 5
5. First longitudinal vein ends far beyond the middle of the costa. One
 or more well-developed pairs of anterior acrostichal bristles

Muscina Desvoidy

First longitudinal vein ends before the middle of the costa. No anterior
 acrostichal macrochaetae *Clinopera* v. d. Wulp

¹ These rills are very fine grooves in the surface of the wing which run in a sort of radiate manner toward the border. They are very numerous. A rilled wing denotes a higher stage of development, a more recent form, than an unrilled wing.

² Girschner's *Coenosiinae* includes a few genera which are commonly considered as members of the Acalyprate family *Scatomyzidae*; these genera are not considered by Mr. Stein.

Stomoxys. — I have seen but one American species of this genus, which is the well-known "Stable Fly," *S. calcitrans* L. (Fig. 1, wing and chaetotaxy), very common both in Europe and this country. Of the species mentioned in Osten-Sacken's *Catalog*, *dira* Desv. and *inimica* Desv. are varieties of *calcitrans*; *occidentis* Walk. and *parasita* Fabr. are expressly stated to have plumose antennae, and must therefore belong to some other genus. As to *S. cybira* Walk., Walker himself questions its position in this genus. *S. calcitrans* L. is a brownish gray fly; its thorax has three rather broad, whitish stripes; on each border

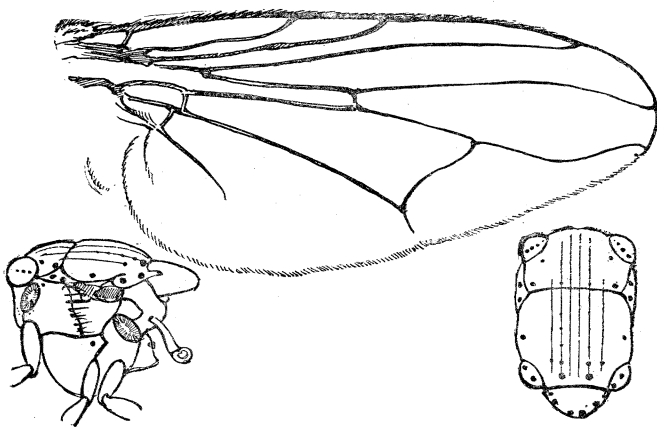


FIG. 1.

of the middle stripe and on the mesal borders of the lateral stripes is a blackish brown line; abdomen yellowish brown; on the second, third, and fourth segments are three brown spots which may be faint or even absent; wings hyaline or tinged with brown at base and along the costa. It has seemed to me that specimens taken on the borders of woods are more likely to have the brownish wings. Antennae brown; palpi yellowish brown; legs blackish brown, with yellowish or reddish knees.

Haematobia. — Two American species are known: *H. ser-rata* Desv. (Fig. 2 a), the "Horn Fly," an unpleasant importation from southern Europe, and *H. alcis*. Snow (Fig. 2 b), found by Professor Dyche in the cranberry swamps of northern Minnesota.

The two species are easily separated by the following points : hind tarsi of male serrate in *serrata*, not so in *alcis*; palpi black in *serrata*, yellow in *alcis*; pile of bucca black in *alcis*, yellow in *serrata*; at cephalo-dorsal angle of mesopleura *alcis*

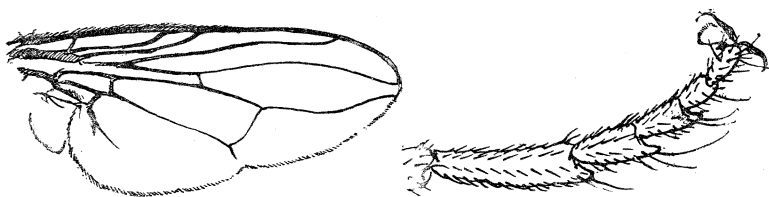
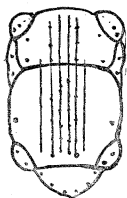
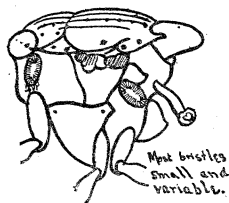


FIG. 2 a.



has a large macrochaeta curved dorsad; *serrata* has no macrochaeta at this point; at the cephalo-ventral angle of the mesopleura (protecting the pro-

stigma) *alcis* has two small bristles; *serrata* has a tuft of golden yellow hairs; *serrata* has much longer and denser pile on the dorsum of the thorax. Other color differences are pointed out by Professor Snow in connection with his description of *alcis* in *Can. Ent.*, April, 1891. I am much indebted to the Entomological Department of Kansas University for a pair of specimens of *H. alcis* which have enabled me to ascertain the important differences in the chaetotaxy of the mesopleurae above mentioned.

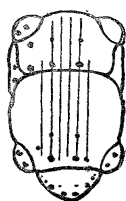
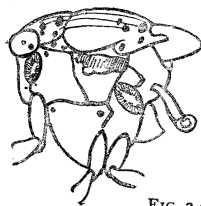


FIG. 2 b.

Hemichlora.—Only known species and type of genus *H. vittigera* Bigot, Mexico. Professor Williston, in his *Manual of North American Diptera*, p. 143, suggests parenthetically that this may be the *Idia viridis* of Wiedemann (*Auss. Zweif.*, Vol. II, pp. 354, 11). I quite agree with this suggestion for the following reasons. Meigen founded the genus *Idia* in 1826, and in his characterization (*Syst. Besch. Eur. Zweif.*, Vol. V, p. 9) the only distinguishing character is the pectinate arista. To this Wiedemann (*loc. cit.*, p. 347) adds: face prolonged forwards

below and entirely without hair. Wiedemann's description of *Idia viridis* is based on one poorly preserved and greasy specimen and reads: "With black antennae, everywhere bronzy green, with hyaline wings and blackish legs. Face and front rusty brown, the green color dark, tending toward emerald green."

Hemichlora has the pectinate arista, a slightly prominent oral margin, and is in part of a metallic blue color. A metallic blue color may vary to metallic green. Certainly *Hem-*

ichlora vittigera comes nearer to the description of *Idia viridis* than any other known North American Muscid. No other *Idia* has been described from North America, and only the original specimen of *I. viridis* is known.

Myospila.—There is but one known North American species, *M. meditabunda* Fabr. (Fig. 3). It is common to Europe and America. Many of our specimens have the pubescence of the eyes very short; in the females sometimes it is very difficult to make

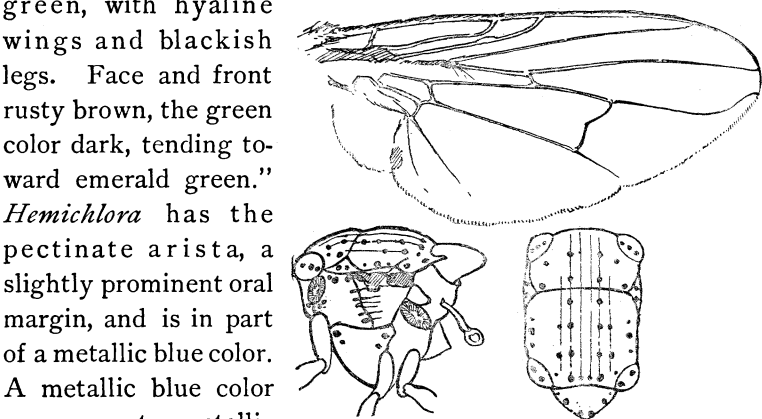


FIG. 3.

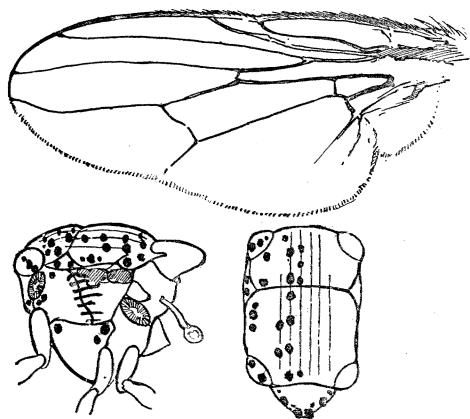


FIG. 4.

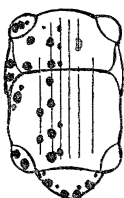
out with an amplification of twenty diameters. No other difference am I able to find between European and American specimens. It seems to me very probable that *Cyrtoneura quadrisetosa* Thomson (*Eugen. Resa*, p. 549) is one of those

specimens whose eyes are almost bare. I have seen such specimens from California.

Muscina.—Until within a few years our species of *Muscina* have been referred to *Cyrtoneura*. Such authorities as van der Wulp and Williston are of the opinion that *Cyrtoneura* is a badly conceived genus



FIG. 5.



and that the name should be dropped, the species formerly referred to it being divided among the genera *Muscina*, *Clinopera*, *Hemichlora*, and *Morellia*. Similarly, *Cyrtoneurina* should be dropped as a generic name, its species being distributed among

some of the genera just mentioned. Following van der Wulp's views in cases where the species are unknown to me, the following are the known North American species of *Muscina*: *stabulans* Fall., *assimilis* Fall., *mexicana* Macq., *pallidicornis*

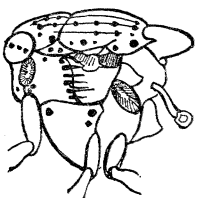
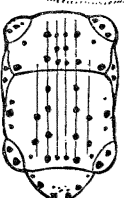


FIG. 6.



Bigot, *parilis* Gigl.-Tos, *vecta* Gigl.-Tos, *linea* v. d. W., *tripunctata* v. d. W., *aurantiaca* nov. sp., and *texana* nov. sp.

The species that I know may be separated by this table:

1. Legs wholly or partly yellow;
palpi yellow 3
2. Legs wholly black 4
3. Antennae brown; three pairs acrostichal
bristles cephalad the transverse suture; prostigma brown;

humeri concolorous with thorax *stabulans* Fall. (Fig. 4)
Antennae pale yellow; one pair acrostichals cephalad the suture; prostigma
whitish yellow; humeri not concolorous with thorax *texana* nov. sp. (Fig. 7)

4. Palpi and antennae *assimilis* Fall. (Fig. 5)
 Palpi and antennae orange yellow . . . *aurantiaca* nov. sp. (Fig. 6)

M. aurantiaca nov. sp. — Male and female; several specimens collected by Mr. G. R. Pilate at Tifton, Ga. General appearance like that of *stabulans*, *assimilis*, and *pabulorum*, i.e., with gray-striped thorax and abdomen with variable spots. Chaetotaxy like *stabulans*, etc.

M. texana nov. sp. — Two males, Texas. Agrees very closely with Giglio-Tos's descriptions of *M. parilis* and *M. vecta*, from which its rather broad front, with the series of transfrontal

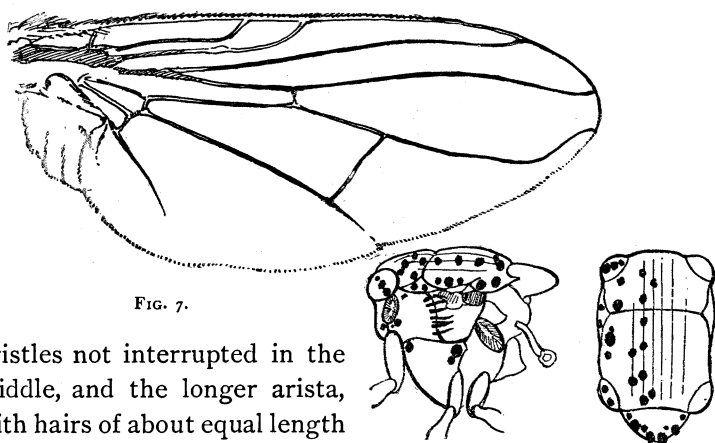


FIG. 7.

bristles not interrupted in the middle, and the longer arista, with hairs of about equal length (if anything longer at the middle of the arista than at the base), and much more scattered than in *vecta* and *parilis*, clearly separate it. The same characters separate it from *M. linea* v. d. W. I separate it from *tripunctata* v. d. W. because of the striking appearance of the prostigma, which I think Mr. van der Wulp would hardly have failed to note had it been present in his specimens.

Clinopera (Fig. 8, *C. inuber* G.-Tos). — Mr. van der Wulp describes in *Biologia Centrali Americana* seven species, and refers to this genus *Cyrtoneurina uber* G.-Tos, *inuber* G.-Tos, *gluto* G.-Tos, and *pellex* G.-Tos. All these species are Mexican. He also refers *Cyrtoneura anthomydea* Bigot to *Clinopera*. It seems to me that there is nothing in Bigot's description that does not apply to *Muscina assimilis* Fall., specimens of which

from the Rocky Mountains (the source of Bigot's specimen) are in my collection.

MUSCINAE MUSCAEFORMES.

1. Middle tibia with a prominent macrochaeta on its flexor surface . . . 2
(The male of some European Mesembrinae has no such macrochaeta, but its middle tibiae are elongate and on their flexor surface thickly hairy.)
Middle tibiae without such a prominent macrochaeta . . . 3
2. Sternopleural macrochaetae 1 : 2 ; elbow of fourth vein forming a rounded angle ; no orbital macrochaetae, but the geno-vertical plate uniformly beset with minute bristly hairs ; transfrontal macrochaetae small and weak, often difficult to see . . . *Pseudopyrellia* Girschner.

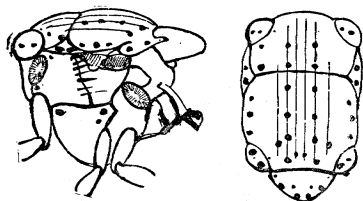


FIG. 8.

Sternopleural macrochaetae 1 : 3 ; first longitudinal vein ending in the costa at about the middle of the wing ; small cross-vein about opposite the end of the first longitudinal ; elbow of fourth longitudinal not forming an angle but a gentle curve convex toward the hind border of the wing forming

an apical cross-vein which is longer than the terminal portion of the fourth vein before its curvature . . . *Pyrellia* Desvoidy

Sternopleural macrochaetae varying, 1 : 3, 1 : 2, 0 : 1 ; if (rarely) 1 : 1 then the anterior notably the smaller ; first longitudinal vein ending in the costa far beyond the middle of the wing ; small cross-vein a long distance basad to the end of the first longitudinal ; fourth longitudinal sweeping in a broad curve, convex toward hind border of wing, towards the third, thus forming an apical cross-vein, which, however, in our species, is not longer than the terminal portion of the fourth vein before its curvature . . . *Mesembrina* Macquart

3. Bend of fourth longitudinal forming a rounded angle. Outline of arista as a whole fan-shaped. Sternopleural macrochaetae 1 : 2.

Musca Linnaeus

Bend of fourth longitudinal not forming an angle at all, but a gentle curve . . . 4

4. Antennae separated at their base by a distinct ridge ; sternopleural macrochaetae 0 : 2 ; eyes very distinctly hairy *Graphomyia* Desvoidy

Antennae not thus separated ; sternopleural macrochaetae 1 : 2 ; eyes not distinctly hairy . . . 5

5. Arista naked . . . *Synthesiomyia* Brauer and Bergenstamm

Arista plumose . . . *Morellia* Desvoidy

Pseudopyrellia (Fig. 9).—Our only known species is *P. cornicina* Fabr. I consider *Lucilia carolinensis* Desv., *L. compar* Desv., and *L. Heraea* Walk., as synonyms.

Pyrellia (Fig. 10).—The only North American species that I have seen is *P. cyanicolor* Zett. The specimens agree perfectly with the description and with European specimens from Prof. G. Strobl and others. *P. setosa* Lw. is a synonym; I have compared the types in the Agassiz Museum with my

American and European specimens. Occasionally one finds a specimen which is of a rather bright metallic green instead of the usual dark steely blue, but I can find no structural or other color differences. *Musca occidentis* Walk., *Dipt. Saund*, p. 347, is probably this same species.

P. cadaverina L. may be distinguished from *cyanicolor* by the entire absence of any trace of hoary coating on the thorax even at the cephalic border, while *cyanicolor* has three broad hoary stripes, a median and two humeral, which are specially distinct at the cephalic border.

Mesembrina.—There is but one known North American species, which we must call *M. latreillii* Desv. (Fig. 11) because no other species is known. Desvoidy says: "Tout à fait semblable au *M. meridiana*; un peu plus petite; antennes brunes; la face est d'un argenté brillant sur les côtés." Now

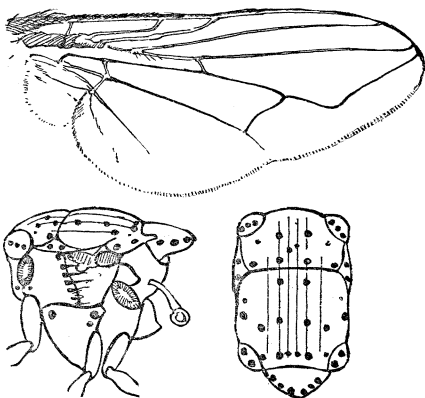


FIG. 9.

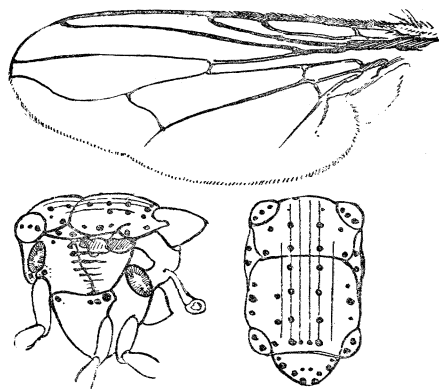


FIG. 10.

the species is by no means just like *M. meridiana* (Fig. 12); it does not average smaller than that species; the antennae vary in color from yellow to brown; the sides of the face are, however, silvery. The species agrees perfectly with the description of

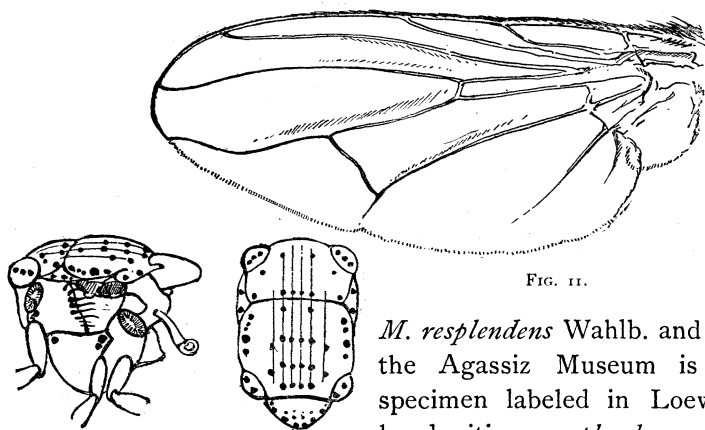


FIG. 11.

M. resplendens Wahlb. and in the Agassiz Museum is a specimen labeled in Loew's handwriting *resplendens*. I think there can be no doubt of the synonymy. Mt. Washington, N. H.; North Mt., Pa.; Seattle, Wash.; Dakota. For comparison I introduce here Fig. 13, *M. mystacea* L. If the truth could ever be known, it is highly probable that *M.*

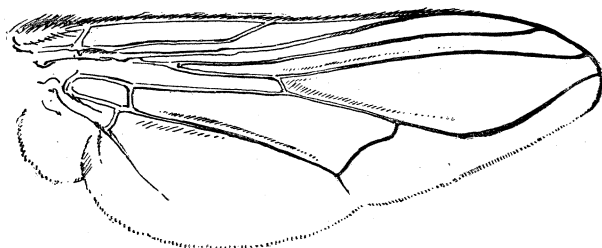


FIG. 12.

pallida Say would be found to be an *Oestrophasia* very near or identical with *O. punctata* Coq.

M. anomala Jaennicke is evidently not a *Mesembrina* at all. Professor Brauer suggests that it belongs near *Spilogaster*.

Musca. — *M. domestica* L. (Fig. 14) is very common. Walker says that *M. corvina* Fabr. occurs in Nova Scotia. The front of *corvina* is very narrow in the male, that of the male *domes-*

tica is about one-fourth as wide as the head; the frontal vitta of the female *corvina* is of uniform width throughout, while that of the female *domestica* is narrow near the antennae and broadens out very considerably towards the vertex. Specimens from

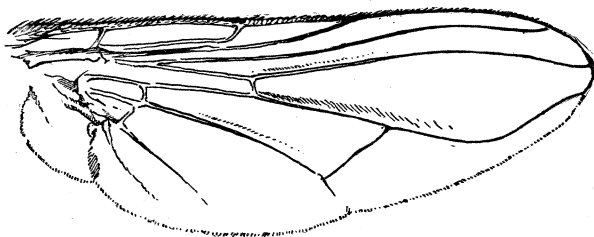


FIG. 13.

Jamaica, agreeing with Macquart's description of *M. basilaris*, are certainly *M. domestica*.

Graphomyia (Fig. 15). — Our single species does not differ structurally and has but insignificant color differences from *G.*

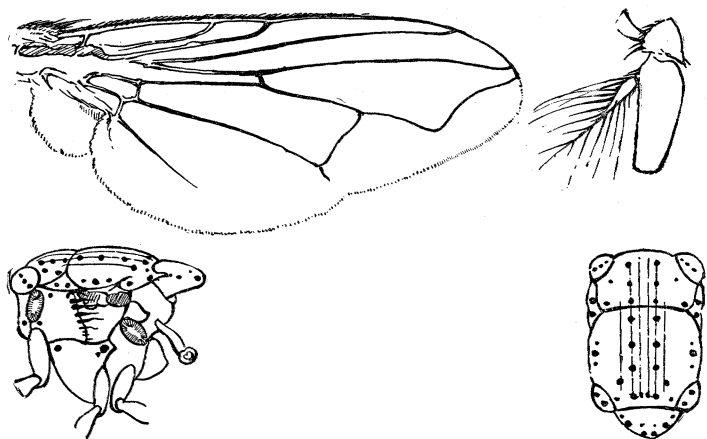


FIG. 14.

maculata Scop., with which I identify it. *G. americana* Desv. is the same species.

Synthesiomyia. — *S. brasiliana* BB. occurs in Florida and in Georgia (Fig. 16). It is the only species of the genus.

Morellia. — *M. micans* Macq. (Fig. 17) is very common all over the United States. Bluish black; thorax with three broad

hoary stripes; last abdominal segment of female brown with hoary coating. Macquart described the female only; the male resembles the female in color (except that the last abdominal

segment has much less of a brown color) and has the following structural features which are characteristic: a

beard of long hairs on the mesal border of the hind tarsi and a fringe of short, fine hairs on the anterior surface of the middle tibiae not far from the extensor border.

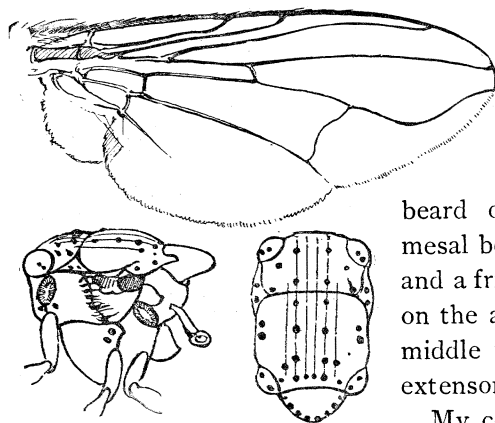


FIG. 15.

My collection contains also two species of *Morellia* from Mexico and Jamaica. One is rather variable, the variations corresponding to the descriptions of *Musca violacea* (Fig. 18) Fabr., *Pyrellia maculipennata* Macq., *P. specialis* Walk., *P. sus-*

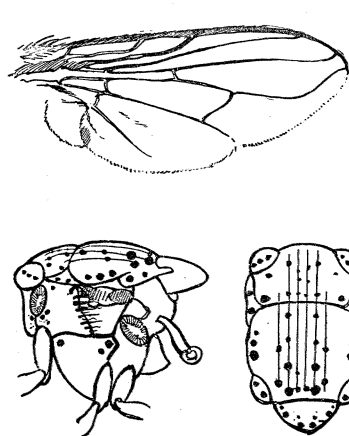


FIG. 16.

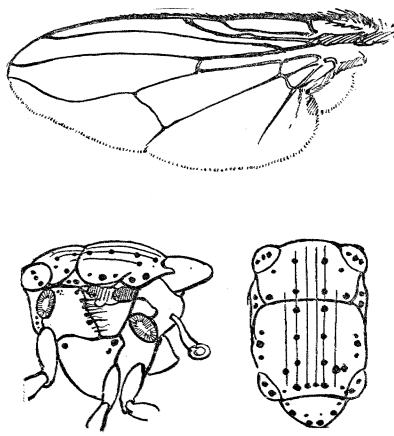


FIG. 17.

picax Walk., *P. basalis* Walk., *P. centralis* Lw. (types compared and found to agree), and *P. iris* Bigot. Fabricius's name has priority. The male has on the anterior surface of

the middle tibia, near the extensor border, a series of bristles extending from base to apex; the basal half of the series are very tiny but stout as compared with their length, real little spines; at about the middle of the series the form changes gradually to that of a delicate and moderately long bristle. This arrangement is very like that of the European *M. hortorum* Fall. My specimens of this species are from Jamaica, C. W. Johnson, and from Mexico, O. W. Barrett.

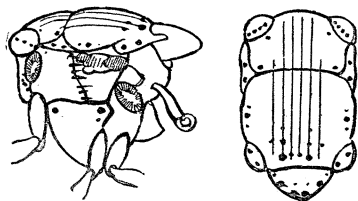


FIG. 18.

The other species agrees with the descriptions of *Pyrellia scapulata* Bigot (Fig. 19) and *P. flora* Bigot. The middle tibia

of the male has some noteworthy structures. On the anterior surface at the base is a tubercle about 0.3 mm. (one-seventh the length of the tibia) long and half as broad, its long diameter parallel to that of the tibia. On this tubercle is a row of six or eight very short thick spines, and in some specimens a second

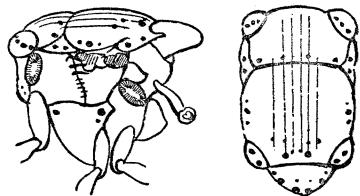


FIG. 19.

row, flexad the first, of about four similar but much smaller spines, can be made out. From the apical end of the tubercle the principal row is prolonged as a series of about equal and equidistant, much more delicate spines, as far as the apex of

the tibia. Just at the junction of the posterior and flexor surfaces there are three large bristles; one is at the junction of the basal and middle thirds, the second at the middle of the tibia, the third at the junction of the middle and apical thirds. My specimens of this species are from Jamaica, collected by C. W. Johnson. The name *scapulata* has priority.

CATALOGUE OF MUSCINAE MENTIONED IN THIS PAPER BUT NOT
REFERRED TO IN OSTEN-SACKEN'S CATALOGUE.

Haematobia serrata Desv., Myod., 389, 3.

Haematobia alcis Snow, *Can. Ent.*, April, 1891. Vol. xxiii, pp. 87-91.

Hemichlora vittigera Bigot, van der Wulp, *Biol. Cent.-Amer.* Vol. ii,
p. 304.

Cyrtoneura Bigot, *Bull. Soc. Zoöl. Fr.*, p. 613, male. 1887.

Cyrtoneurina Gigl.-Tos, *Mem. R. Accad. Sci. Torino.* Ser. 2, vol.
xlv (sep.), p. 13, female.

Muscina assimilis Fall.

Musca assimilis Fall., *Dipt. Suec.*, *Musc.*, 56, 41. 1820.

Musca caesia Meigen, *Syst. Besch.* Vol. v, p. 76, 43. 1826.

Muscina concolor Desv. (?), *Myodaires*, p. 408, 5. 1830.

Muscina fungivora Desv., *loc. cit.*, p. 408, 6.

Cyrtoneura aperta Macq., *Dipt. du Nord de Fr.*, 11, 4. 1834.

Musca borealis Zett., *Ins. Lapp.*, p. 660, 28. 1838-40.

Cyrtoneura caesia Meig., *Syst. Besch.* Vol. vii, p. 309, 5. 1838.

Cyrtoneura aperta Macq., Meigen, *loc. cit.* Vol. vii, p. 309, 14.
1838.

Cyrtoneura caesia Meig., Zetterstedt, *Dipt. Scand.* Vol. iv, p. 1351,
5. 1845.

Cyrtoneura assimilis Fall., Zett., *Dipt. Scand.* Vol. iv, p. 1351,
6. 1845.

Cyrtoneura caesia Meig., Schiner, *Fauna Austr.* Vol. i, p. 597.
1862.

Cyrtoneura assimilis Fall., Schiner, *loc. cit.*, p. 598. 1862.

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and 216. 1862.

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Cyrtoneura pallidicornis Bigot, *Bull. Soc. Zoöl. Fr.* Vol. xii, p. 614.
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Muscina parilis Gigl.-Tos, van der Wulp, *loc. cit.*, p. 311.

Cyrtoneurina parilis Gigl.-Tos, *loc. cit.*, p. 14, No. 154.

Muscina vecta Gigl.-Tos, van der Wulp, *loc. cit.*, p. 311.

Cyrtoneurina vecta Gigl.-Tos, *loc. cit.*, p. 14, No. 155.

Muscina linea v. d. W., *loc. cit.*, p. 304.

Muscina trilineata v. d. W., *loc. cit.*, p. 305.

Muscina texana nov. sp.

Muscina aurantiaca nov. sp.

Clinopera. Mr. van der Wulp's species are described in *Biol. Cent.-Amer.*,
Dipt. Vol. ii, pp. 305-310. He includes *C. uber* Gigl.-Tos and

inuber Gigl.-Tos in his table, p. 306, and makes some remarks on them, pp. 307 and 308. On p. 311 he refers *Cyrtoneurina gluto* Gigl.-Tos and *pellex* Gigl.-Tos to *Clinopera*. All these species of Giglio-Tos were described as *Cyrtoneurinae* in Mem. R. Accad. Sci. Torino, ser. 2, vol. xlv (sep.), pp. 14-17. *Cyrtoneura anthomydea* Bigot, Bull. Soc. Zool. Fr., vol. xii, p. 614 (1887), is referred by Gigl.-Tos, *loc. cit.*, p. 15, to *Cyrtoneurina*, and by van der Wulp, *loc. cit.*, p. 311, to *Clinopera*.

Pyrellia cyanicolor Zett., Dipt. Scand. Vol. iv, p. 1323, 4.

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Pyrellia setosa Loew, Centuriae. viii, 63.

Synthesiomyia brasiliana BB. Brauer and Bergenstamm, Vorarb. z. Monog. Musc. Schiz. Vol. iii, pp. 96 and 110.

Morellia violacea Fabr.

Musca violacea Fabr., Syst. Antl., p. 288, No. 25; Wied., Auss. Zweif. Vol. ii, p. 409, 43.

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Pyrellia iris Bigot, Ann. Soc. Ent. Fr., p. 36, female. 1878.

Pyrellia centralis Loew, Centuriae. viii, 62.

Morellia scapulata Bigot.

Pyrellia scapulata Bigot, *loc. cit.*, p. 35, female. Mexico.

Pyrellia flora Bigot, *loc. cit.* Male. Haiti.